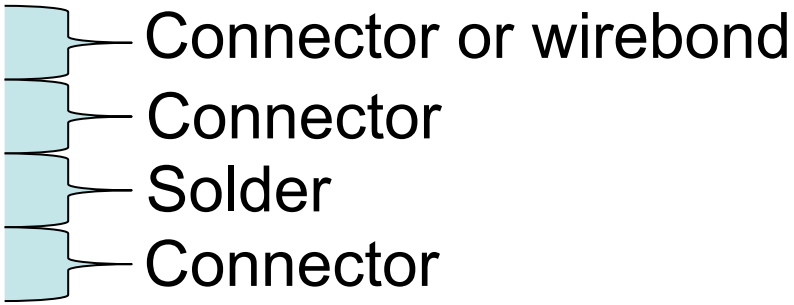
Inner Alternative Layout

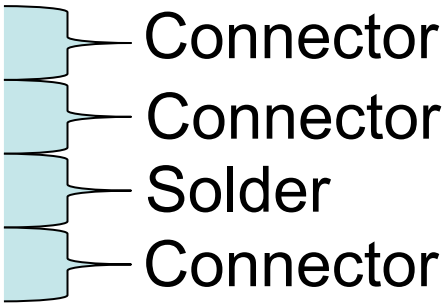
Electrical servicing scheme

Inner Alternative Electrical Services

- Barrel Connectivity Steps
  - Module
  - Module Flex (or « pigtail »)
  - PP0 Flex
  - Type 1 services
  - PP1 (outer cryostat flange)



- Ring Connectivity Steps
  - Module
  - Ring Flex
  - PP0 Flex
  - Type 1 services
  - PP1 (outer cryostat flange)



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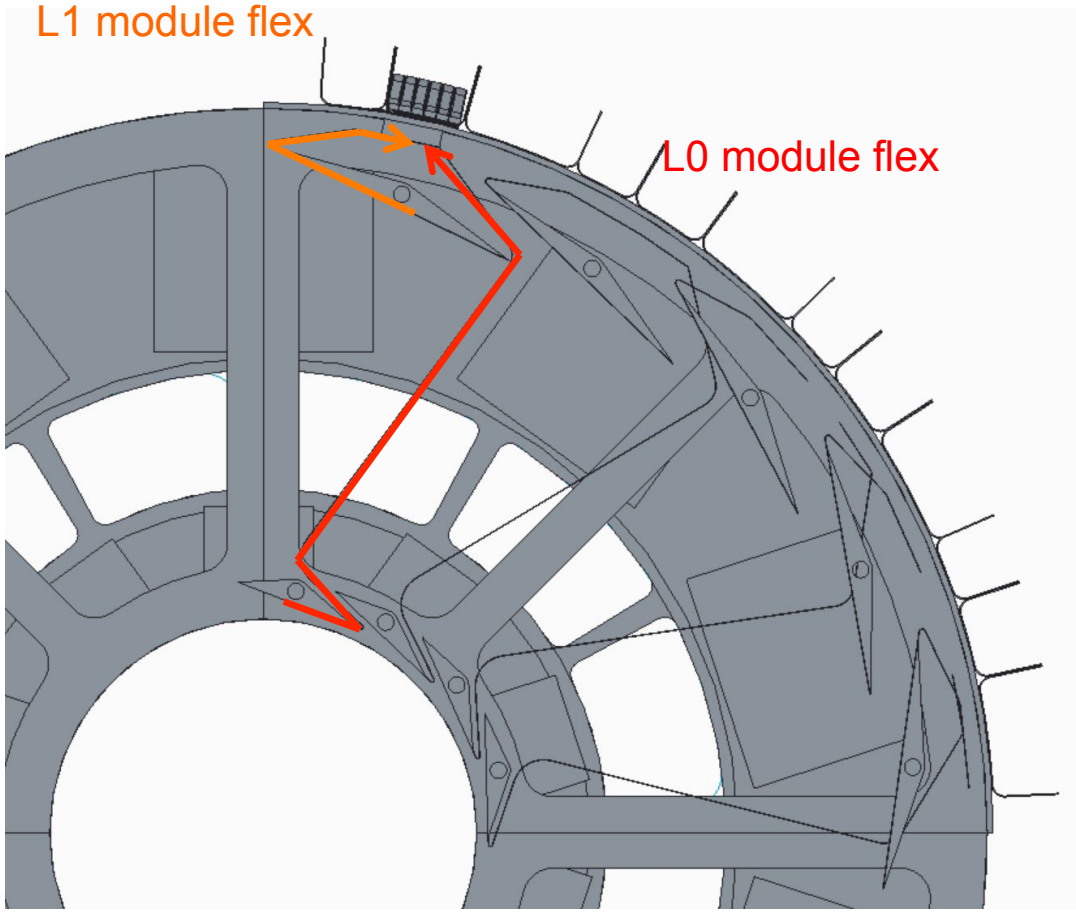
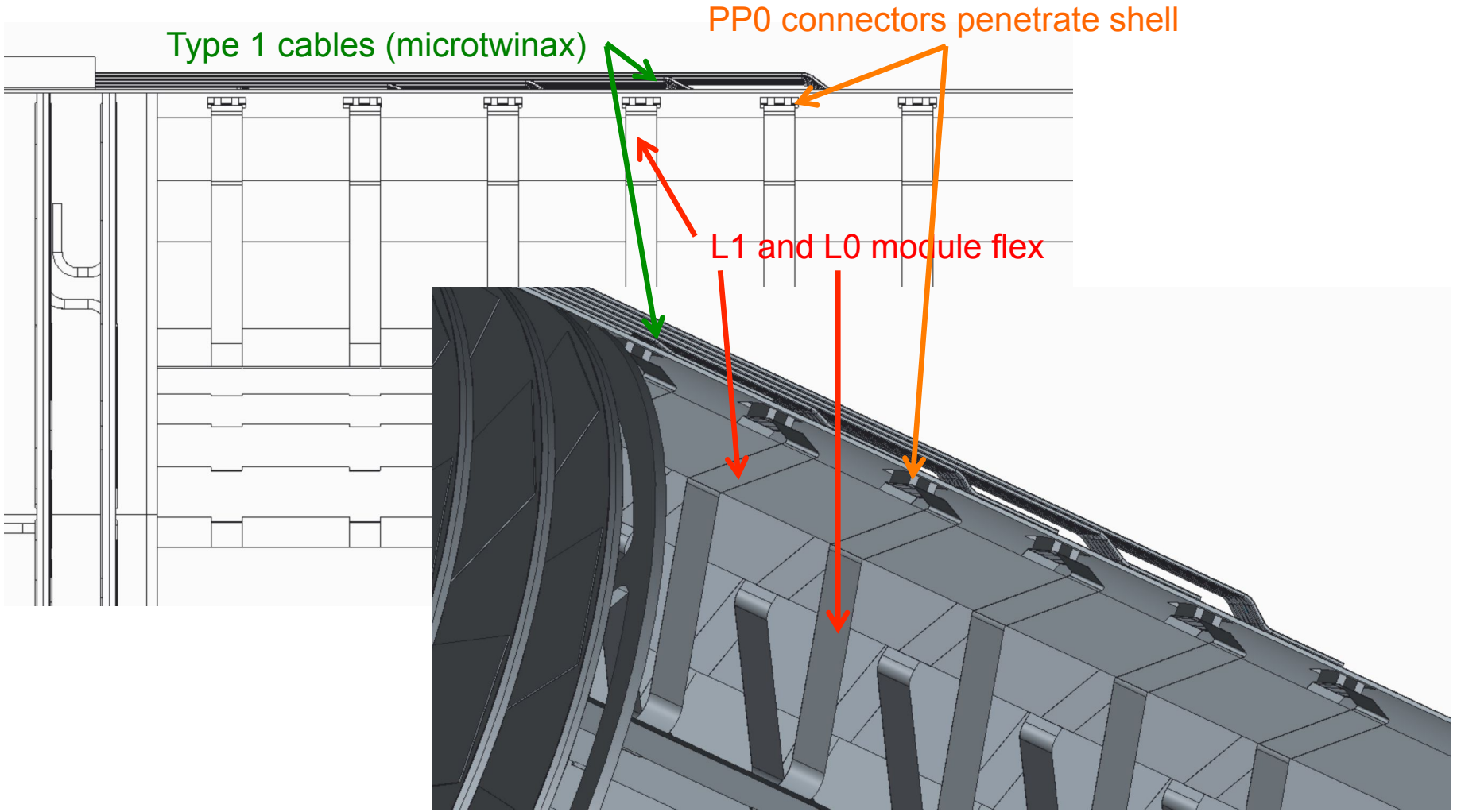
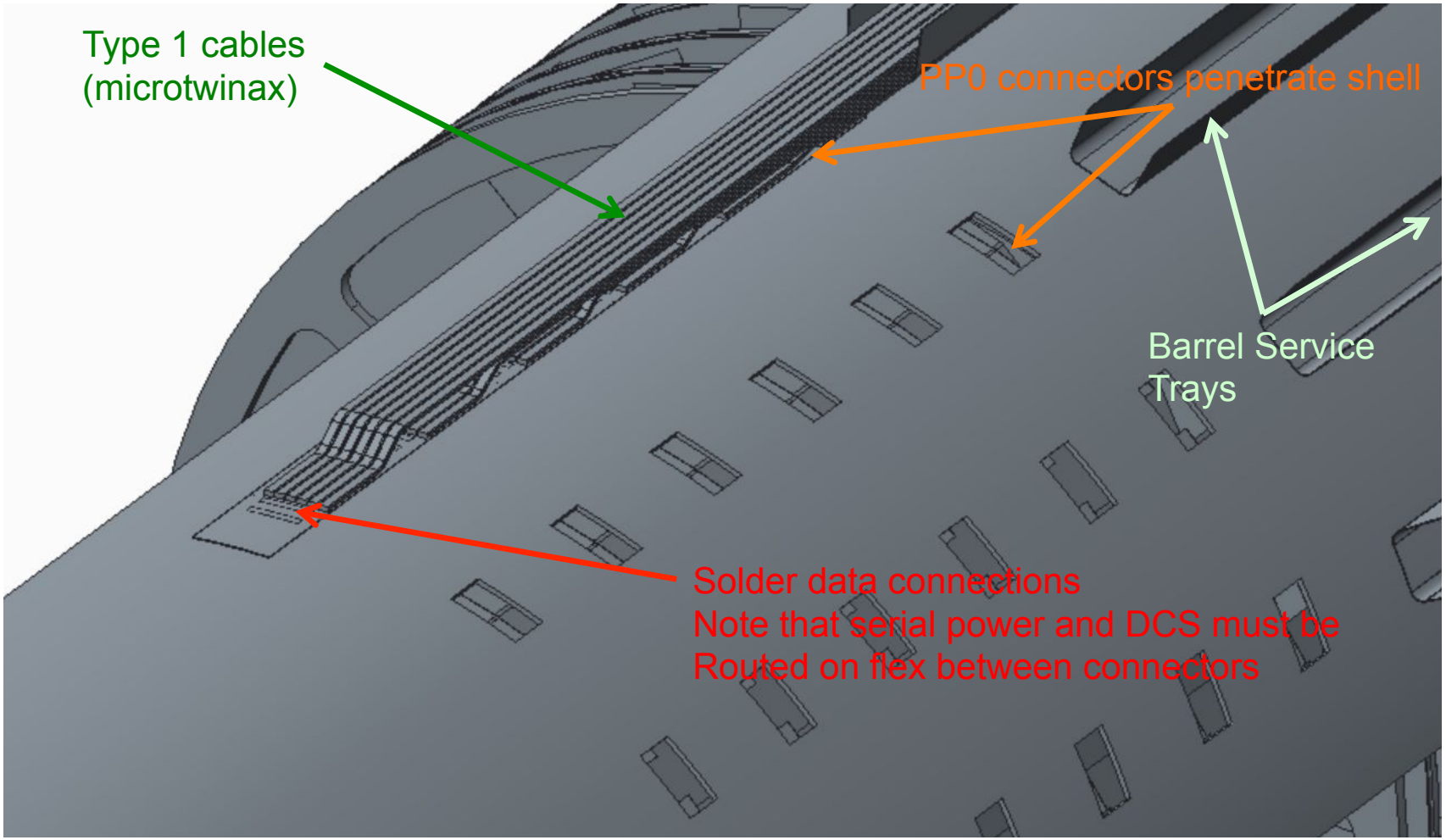
Barrel Connections – Module Flex



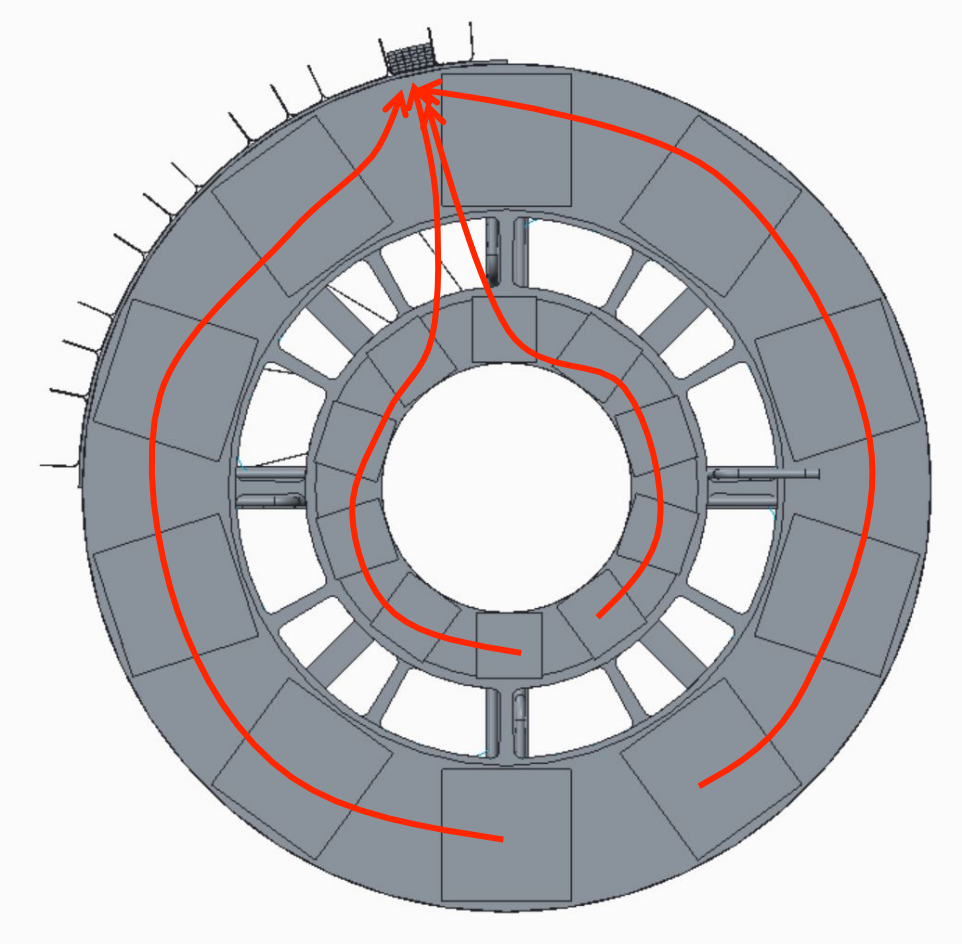
Barrel Connections – PP0



Barrel Connections – PP0 Flex



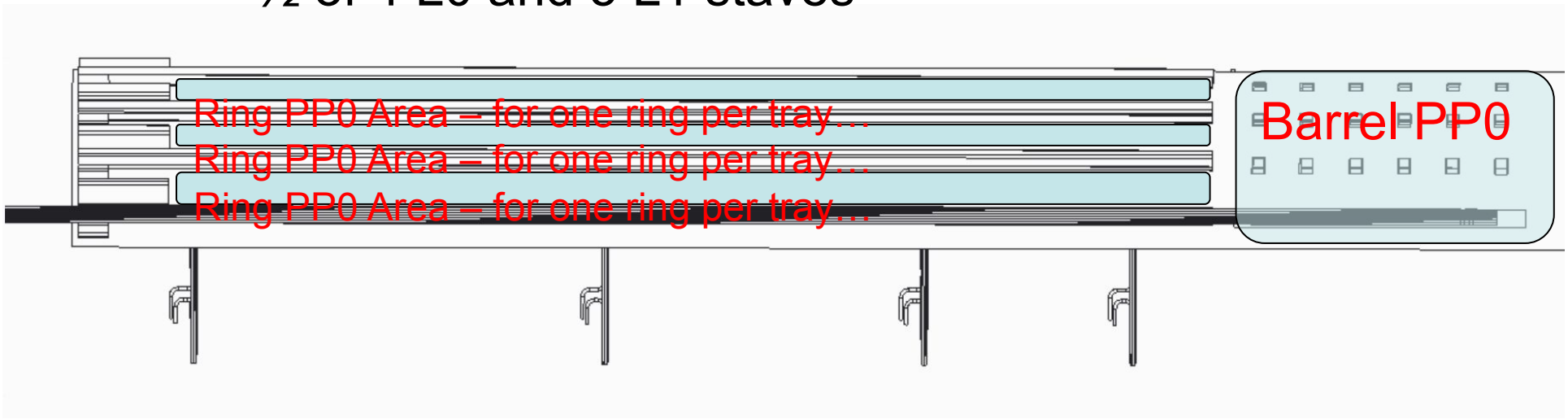
Ring Connections – Ring Flex



- Rings are integrated As full disks
- All connections must be made to one quarter shell
- So something (flex?) must bridge between modules and PP0
- Would like to avoid a module flex + ring flex + PP0 flex

PP0 Space

- One quadrant must integrate and service (per side)
  - 4 coupled rings
  - ½ of 4 L0 and 5 L1 staves



Recap of Electrical Services

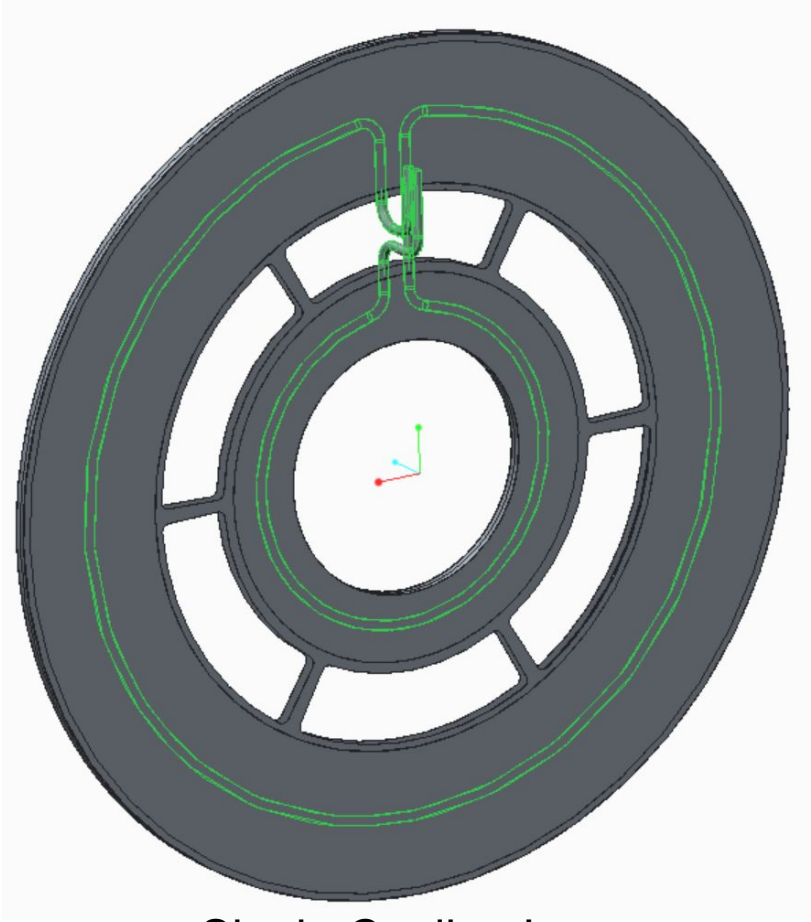
- Barrel Flexes Needed
  - Module Flex (or « pigtail »)
    - With connector to PP0 Flex
  - PP0 Flex
    - Soldered to Type 1 services
  - There are at least L0 and L1 variants
- Ring Flexes Needed
  - Ring Flex (if module flex can be avoided)
    - Connectors to modules
    - Connector to PP0 Flex
  - PP0 Flex
    - Soldered to Type 1 services

Some old reference slides…

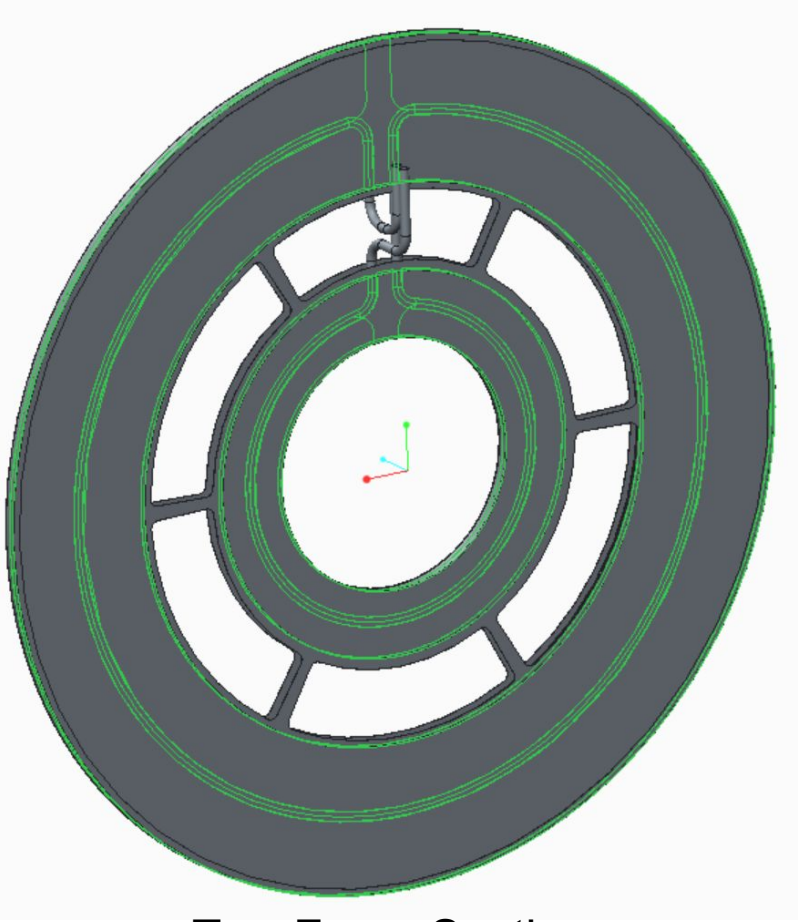
Dimensions and Types of Structures

- Barrel
  - 16x R39 layer – single chip width
  - 20x R100 or R108 layer – double chip width
- « Barrel » or « inclined » region
  - 16x L0 from R~36-55mm
  - 15x L1 from R~80-118mm
- Inner « Endcap »
  - 4x Rings from 50-90mm
  - 11x Rings from 80-120mm

Coupled Ring



Single Cooling Loop

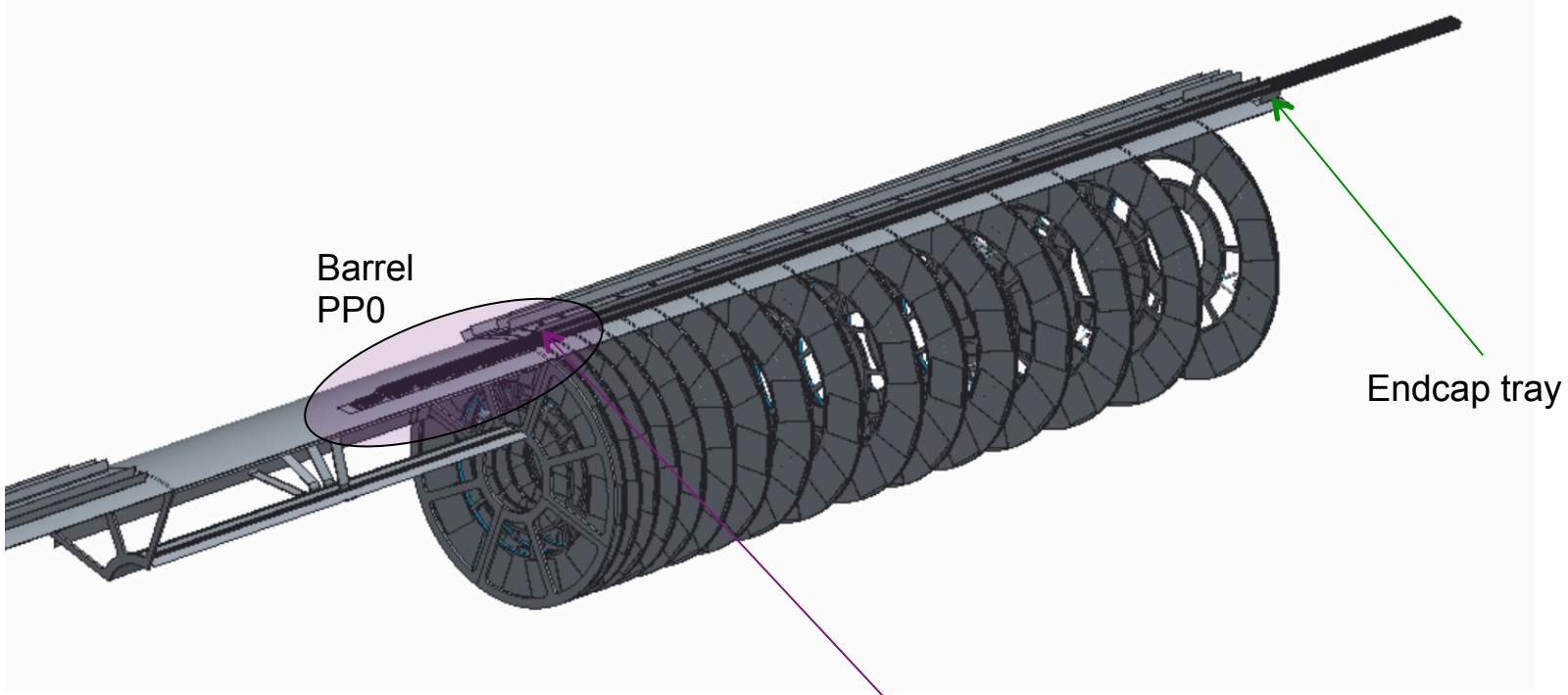


Two Foam Sections

Assembly

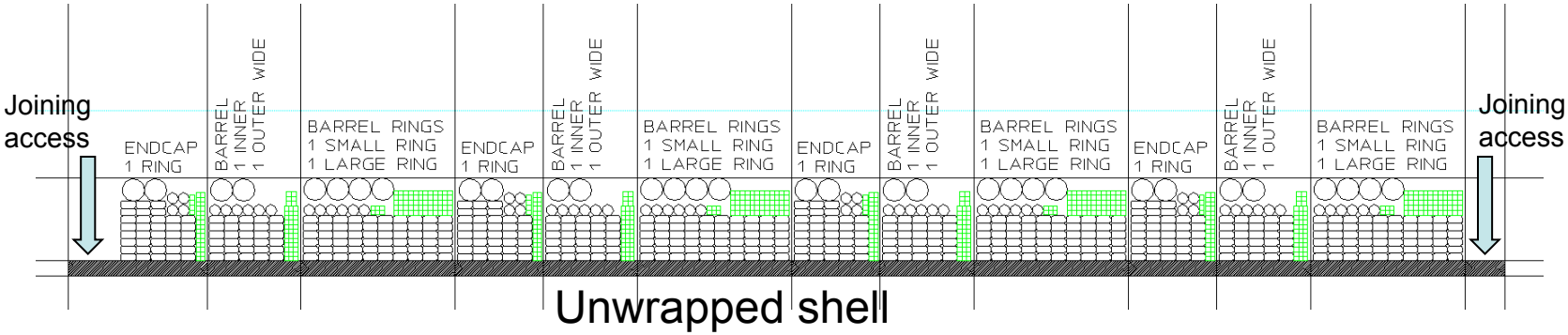
- Detector is probably divided into 3 sections
  - Barrel (including « barrel rings » or « inclined »)
  - 2 Endcaps
  - However, phi space for services is continuous through all Z (no overlaps)
- Cooling pipe manifolding is assumed at PP0 (i.e. pipes for all structures lead to one common rail to PP1)
- Services routed on single outer shell
- Detector is assembled as:
  - Quadrants form halves
  - Halves are joined
  - IPT (if needed) or BP is inserted

Service Trays on Shell



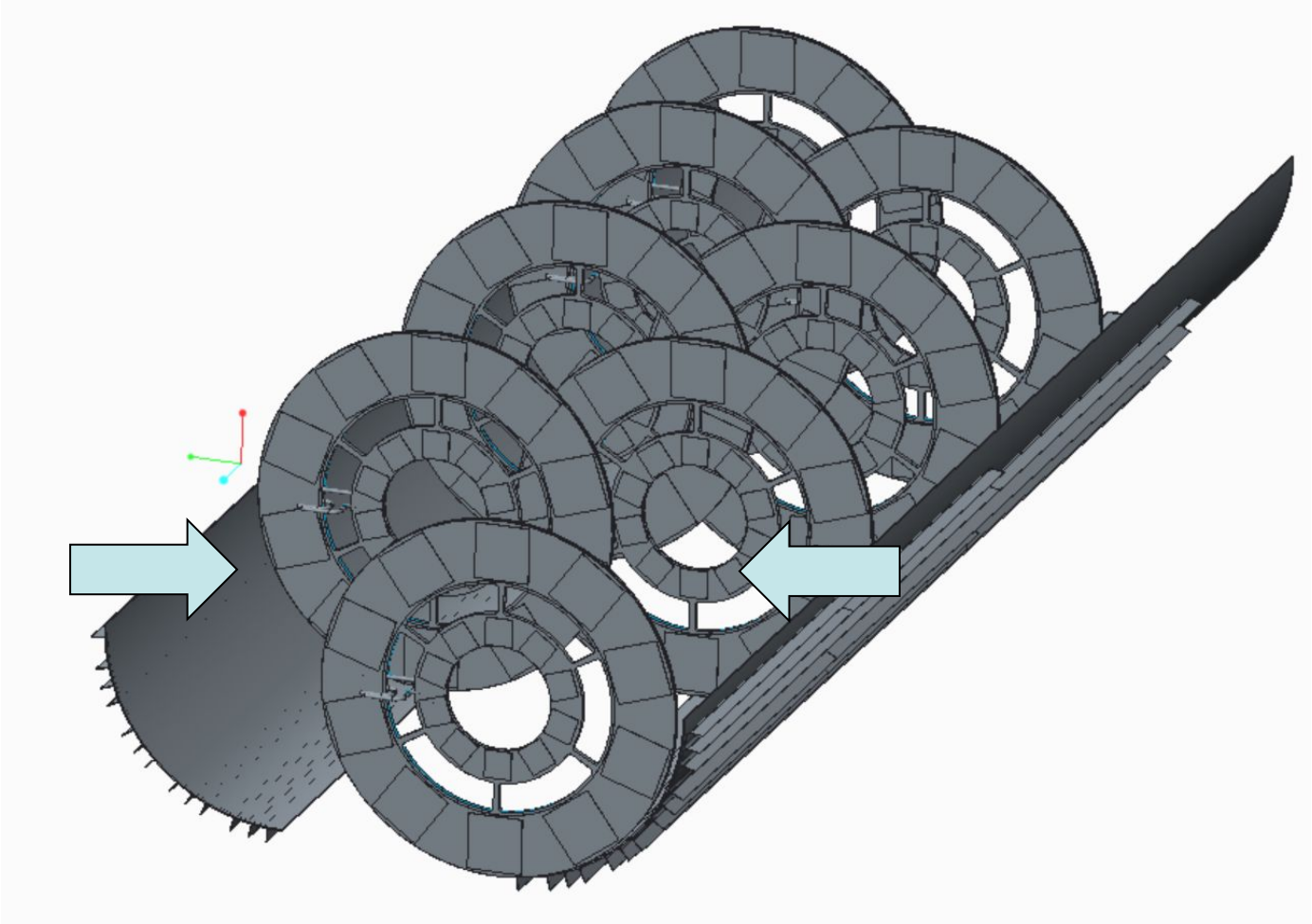
In reality only 4 rings are
Integrated on one ¼ shell

Services Load

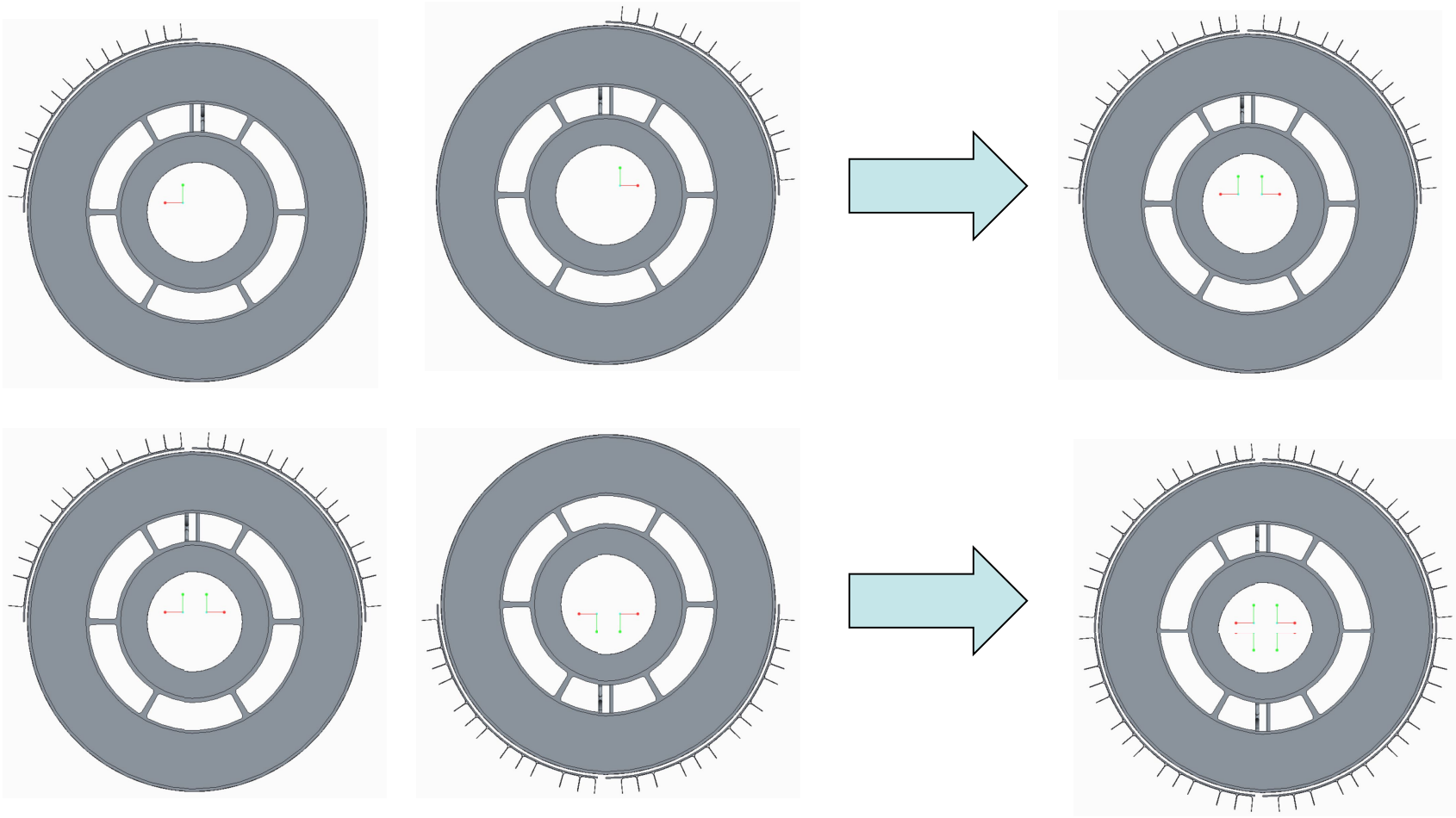


- Single Quadrant
  - Four fold repetition in quadrant (in some places loading is lower, when one ring is missing)
  - 5 L1 staves are distributed over the barrel slots
- Cooling pipes are 1:1 and added last
- These services are soldered to connector flexes/boards which should probably just be called PP0
- Difference between CLCK/CMD and DCS x3 has been ignored (larger size taken at 25% penalty)
- Services would be assembled into “harnesses” for each section and laid into “trays” co-bonded to the shell (not shown, but space left for them)

Assembly of Two Quadrants



Assembly in Quadrants and Halves



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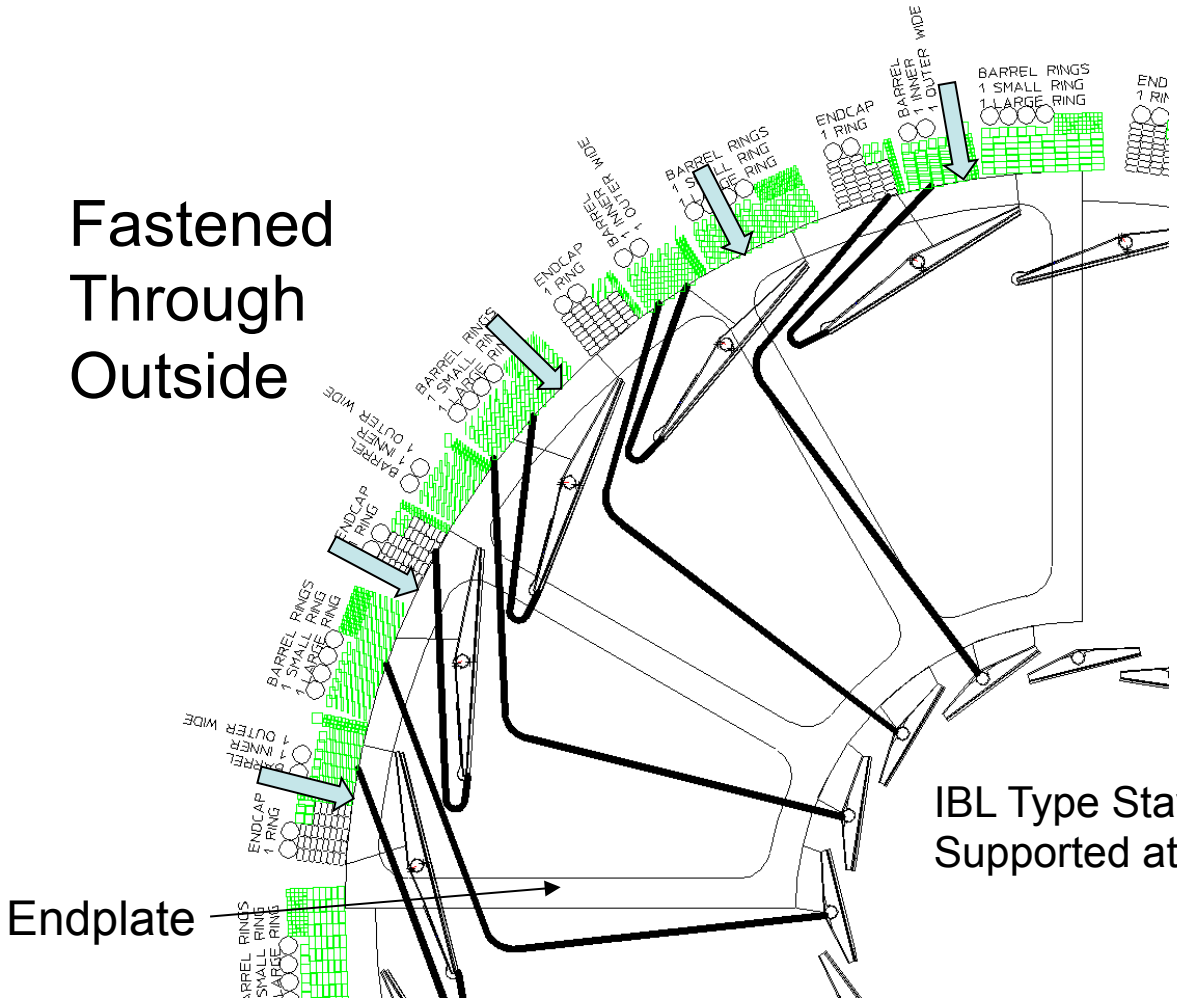
Barrel Integration

Fastened
Through
Outside



Sequentially
Loaded
Through
Quadrant

Connections
Made inside
To Connector
Penetrations

IBL Type Stave
Supported at Ends/Center

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